Reward Modulates Visual Selective Attention

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This thesis contributes to a body of literature, which shows that learning about rewards has a large impact on the allocation of attention. Through Pavlovian and instrumental learning strategies we can assess which stimuli are predictive of or associated with reward, so that visual selective attention is biased towards them. The idea is that the activity level across the attentional priority map reflects the interplay between stimulus-driven and goal-driven processing, which can be modulated by the learned significance or reward value that stimuli have acquired over time through experience. These reward-driven effects seem to be automatic, resistant against strategic goal-driven attentional control, and stimulus-driven in nature. Mechanistically, short- and long-term memory mechanisms are responsible for the activation of flexible and stable value-based stimulus representations throughout the brain, which bias attentional priority in favor of stimuli associated with the highest overall value. This implies that learning about the reward value of stimuli can elicit short-lived effects on the flexible deployment of attention, but also that reward-driven attentional processing can become habitual such that attention remains persistently biased towards reward associated stimuli, even if those stimuli are no longer predictive of reward. Future research should focus on how visual selective attention and reward learning processes jointly serve cognition in order to maximize behavioral outcomes in terms of reproduction, survival and wellbeing.

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REWARD MODULATES VISUAL SELECTIVE ATTENTION

BERNO BUCKER

Value Driven Attentional Capture

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DOCTORAL RESEARCH THESIS

REWARD MODULATES VISUAL SELECTIVE ATTENTION

Attentional priority
=
bottom-up
+
top-down
+
selection history

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